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Citation style: Plit Joanna, Myga-Piątek Urszula. (2014). The degree of landscape openness as a manifestation of cultural metamorphose. "Quaestiones Geographicae " (Nr 33, iss. 3 (2014), s. 145-154), doi 10.2478/quageo-2014-0036

THE DEGREE OF LANDSCAPE OPENNESS AS A MANIFESTATION OF CULTURAL METAMORPHOSE

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Manuscript received: May 12, 2014
Revised version: August 1, 2014

PLIT J., MYGA-PIĄTEK U., 2014. The degree of landscape openness as a manifestation of cultural metamorphose. Quaestiones Geographicae 33(3), Bogucki Wydawnictwo Naukowe, pp. 145–154, 2 figs. DOI 10.2478/quageo-2014-0036, ISSN 0137-477X.

ABSTRACT: The issues of aesthetic assessment of landscapes has now become important due to the need of rational and balanced cultural landscape management and the implementation of the provisions of the European Landscape Convention. The aim of this article is to show the methodology of the assessment and interpretation of the degree of the current openness of the cultural landscape of Poland as an effect of a historical process. The chronological analysis made it possible to single out stages of opening/enclosing of the landscapes of Poland with reference to crucial natural, historical and cultural factors. The degree of landscape openness may be treated as a synthetic indicator of the natural and cultural environment evolution. When a landscape type is viewed as a result of natural and anthropogenic processes, the analysis of proportions between the surface of natural and cultural elements becomes of prime importance. In the historical times, the process of landscape enclosing was not unidirectional. Four stages of transformation of cultural landscapes in Poland have been distinguished. These stages are characterized by differences of the landscape openness. It can be interpreted as the result of cultural metamorphosis.

KEY WORDS: landscape, opening/enclosing landscape process, cultural transformation, Poland

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Introduction

The analysis of a spatial differentiation of physiognomic types of cultural landscapes constitutes a current research issue. Until today, synthesizing descriptions, maps and the assessment of aesthetic qualities of cultural landscapes have been the subject of numerous papers in geography and geoecology (e.g. Richling 1992, Pietrzak 1998, Śleszyński 2007, Polska 2011) .

The issues of aesthetic assessment of landscapes has now become important due to the need of rational and balanced cultural landscape management and the implementation of the provisions of the European Landscape Convention. According to the Convention, *landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors* (Art. 1A, *ELC* 2010, p. 7). This provision, stressing the role of perception in the landscape assessment, once again encourages researchers to take up the subject of visual assessment of the landscape of Poland, this time in a historical context. Following article introduces the thesis that the degree of landscape openness can be analyzed as a manifestation of cultural

metamorphoses. The aim of this article is to show the methodology of the assessment and interpretation of the degree of the current openness of the cultural landscape of Poland as an effect of a historical process. The chronological analysis made it possible to single out stages of opening/enclosing of the landscapes of Poland with reference to crucial natural, historical and cultural factors. The latest 70 years were included in a detailed comparative analysis.

Physiognomy of landscape as a research subject

The analysis of physiognomic features of landscape as a research subject can mainly be found in the French literature, beginning with Vidal de la Blacha (1908, 1922), but also over the next years, for example in the works of Brossaed, Wieber 1984, Cabouret 1984, Solle 1984, Brossard, Joly 1988, 1996, Prrigord 1996. These issues are also present in the literature published in the English language, among others Meeus 1993, 1994, Miller, Law 1997.

In Poland, the foundations for the aesthetic trend in the landscape assessment were mainly laid by urban planners, landscape architects and gardening theoreticians. The research also included the following issues: visibility range, the foreground and the background, structures (horizontal and vertical), various colours, contrast of colours and shapes, and the analysis of impressions (e.g. Forczek-Brataniec 2008, Wejchert 1974). The analysis was based on selected architectural and landscape units and interiors (Bogdanowski 1999). Aesthetic assessments basing on architectural methods are frequently prepared in the form of projects and find practical application. The analysis of the assessment of landscape quality and perception constitutes an important part of geographical literature (e.g. Polska 2011, Rogowski 2009, Śleszyński 1998, 2007, Wojciechowski 1986, 2007). The analysis of assessment criteria (e.g. Myga-Piątek 2007, 2012) is particularly important among other works on the physiogomic landscape assessment.

Over the past years, traditional methods of cartographic analysis used so far have been improved and enriched thanks to the application of spectral analysis and numerical modelling techniques (e.g. Miller, Law 1997, Śleszyński 1998, 2007, Nita, Myga-Piątek 2014).

Researchers looked for preserved elements of cultural landscapes built or developed in various historical periods as a spatial expression of aesthetic canons and architectural styles present in a given period (e.g. Małachowicz 1994, Chmielewski 2012). With the use of old maps, numerous authors reconstructed the changes in land use, in particular changing river channels, lakeside range, irrigation channels, as well as changes in forest cover, in urban areas and rural landscapes (e.g. Antrop 1998, 2003, 2004, 2005, Antrop, Van Eetvelde 2000, Markuszewska 2013, Mizgajski 2007, Plit 2004, 2009, Stepaniuk 2012). Statistical comparisons of the percentage of particular types of lands were sometimes prepared, and conclusions concerning the dynamics and tranformation trends were drawn on the basis of a series of maps. However, attempts to re-interpret pictures reproduced from archival maps paying special attention to the changes in landscape aesthetics were rarely made. Spatial differentiation of the degree of opening or enclosing of the cultural landscape as a function of historical transformations and cultural metamorphoses has not yet been considered by Polish geographers.

Open and enclosed landscape – a discussion of meanings

Opening/enclosing – perceived as a physiognomic feature of landscape – is characterized by a possibility to observe remote horizons and extensive views. The degree of landscape openness may be treated as a synthetic indicator of the natural and cultural environment evolution. When a landscape type is viewed as a result of natural and anthropogenic processes, the analysis of proportions between the surface of natural and cultural elements becomes prime importance.

The change in the degree of landscape opening or enclosing is a long historical and cultural process lasting hundreds or even thousands of years. It has a different course and dynamics in various biomes and is a result of human activities – the development of settlement as well as the occupation and use of a given area for eco-

nomic purposes (Plit 2011, Myga-Piątek 2012). The process of opening or enclosing of landscape is characterized by fluctuations and depends on the population inhabiting a given area, its technological advancement, management, historical events and other factors. It is also determined by natural factors (volcano eruptions, earthquakes, climatic changes, disastrous floods or long-lasting droughts, wind-fallen trees, fires, mass pest outbreaks, epidemics).

Some researchers also identify psychological motivation of the landscape opening. Dubos (1970) noticed that a considerable majority of people claim that optimal living conditions are created in half-open landscapes with small water bodies. When explaining this phenomenon, Dubos referred to primeval determinants from tens of thousands years ago and pointed out to the preference of African savanna landscape – a birthplace of *Homo sapiens*.

From an architectural and planning perspective, there are various types of landscapes, depending on the predominance of particular constituent forms of landscape. The basic classification of landscape in this approach is the division into *open landscape* – primarily represented by rural and agricultural areas, but sometimes also by protected areas (for example national parks, landscape parks, landscape protection areas) and *enclosed landscape* – for example city landscape – represented by highly urbanized areas. Each landscape type contains a set of special forms, characteristic features that determine the basic nature of a given area, therefore, depending on how detailed the research is, the landscape types can be further subdivided (e.g. protected, park, etc.).

Research methodology, source materials

Various source materials were used to develop the maps of opening/enclosing of the cultural landscapes of Poland: satelite and aerial photographs, topographic maps and land cover base map Corine Land Cover 2006. Unfortunately, the photographic and cartographic material did not come from one period. There was over a 10-year difference between the dates of particular materials, which is the reason why the maps cannot be precisely dated.

The division of Poland into huge, relatively homotonic areas in terms of the current degree of opening/enclosing of the landscape constituted the basis for the study. In chosen regions, not only the percentage share was taken into consideration, but also the organization of patches – the internal structure and texture of the landscape, visible on maps and in photographs. The degree of opening/enclosing of the landscape was examined from the level of an observer (140–190 cm) standing on the ground. The assessment and calculation of the degree of landscape opening/enclosing were conducted in the vegetative period and in average visibility.

Field observations were carried out in order to calibrate the method. Along several tens of kilometers of road sections in various Polish territories, perpendicularly to traffic routes, the area of visual penetration was established. The results were marked on maps of the 1:100,000 scale. The field observations were compared with the images on the maps and satellite photographs and the direct measurements results were extrapolated to bigger areas. The average degree of enclosing/opening of the landscape in large regions was calculated and the results were translated into percentages.

The chronological analysis (evolutionary method by Dobrowolska 1948) was used to assess the degree of landscape opening/enclosing as an effect of historical cultural metamorphoses. The stages of the changes of the Polish landscape were determined on the basis of correlation of the current analyses (Figs 1, 2) with the research results previously published by the authors of this article (Myga-Piątek 2012, Plit 2004, 2007, 2009).

The data obtained during the 2010 census were used for the verification of the regions borderlines and possible modification of the assessment of the degree of enclosing/opening of the landscape. In the smallest administrative units, the percentage of the area covered with forests, orchards and permanent crops was calculated and an overall map was created[1].

[1] The calculations and the map were prepared by P. Śleszyński

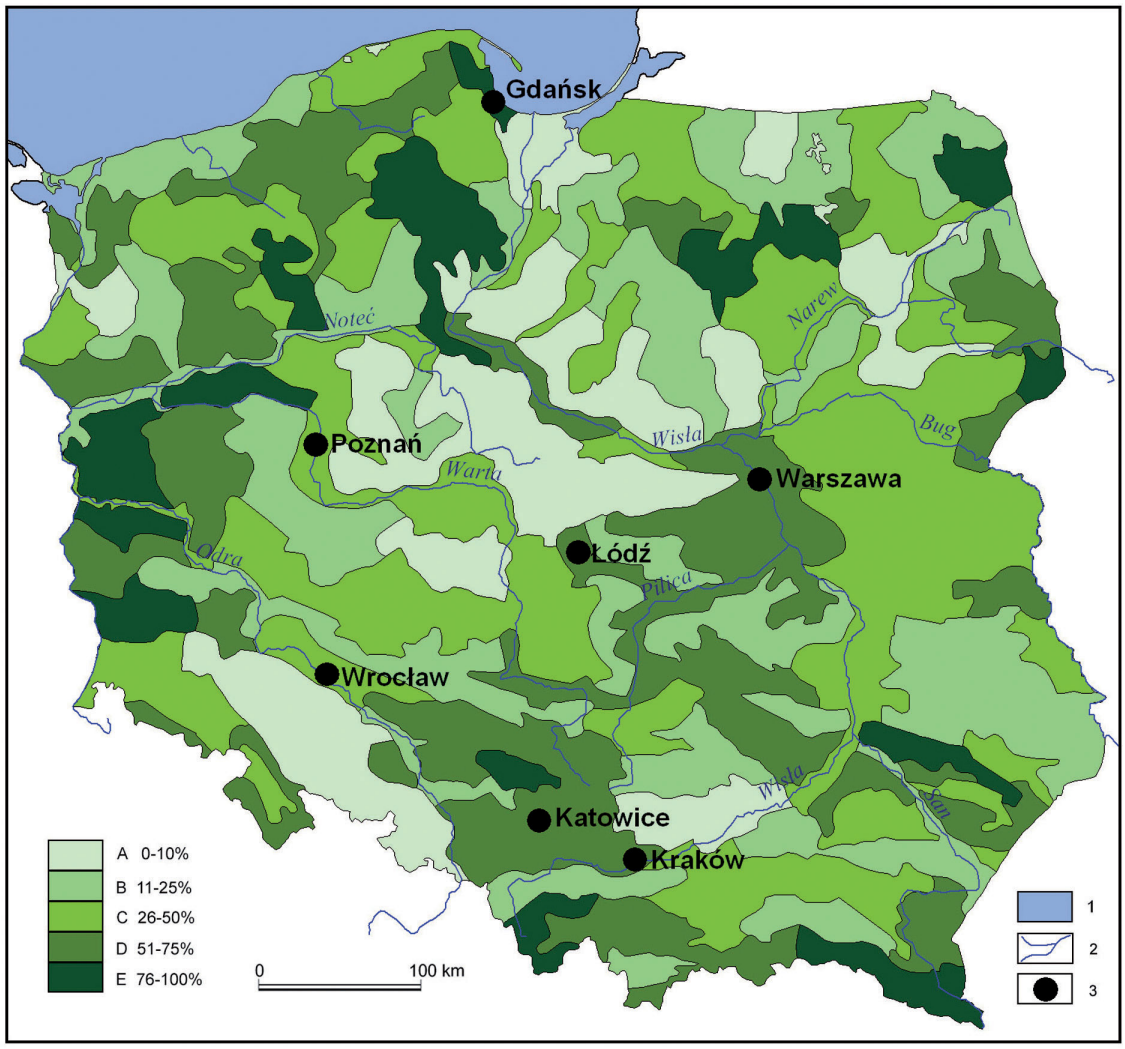

Fig. 1. The current degree of landscape opening/enclosure in Poland:
A – open landscape (0–10%); B – nearly open landscape (11–25%); C – half-open landscape (26–50%); D – considerably enclosed landscape (51–75%); E – enclosed landscape (76–100%); 1 – Baltic Sea, 2 – river network, 3 – larges cities

Findings

The above methodology served as the basis for drawing a map (Fig. 1). It shows the current degree of opening/enclosing of the cultural landscapes in Poland in five categories:

Type A – *open landscapes,* which constitute agricultural areas (mainly farmlands), where the percentage of landscape cover does not exceed 10%.

Type B – *nearly open landscapes,* which are agricultural areas of grazing lands and farmlands with a small percentage of groves and small forests, where the percentage of landscape cover is 11–25%.

Type C – *half-open landscapes,* which are agricultural, grazing and forest areas, where the landscape structure is of a mosaic character and where forests or bushes spontaneously overgrow numerous wastelands. The degree of landscape cover is 26–50%.

Type D – *considerably enclosed landscapes,* with the percentage of landscape cover ranging from 51–75%. These are areas where the horizon is obscured by buildings and structures, high vegetation and convex landforms of the lie of the land (elevations). In most areas in this category, all the elements obscuring the horizon are adjacent to each other or even overlap. There is also a tendency for further enclosing of the landscape.

Type E – *enclosed landscapes* – areas where the horizon is obscured in over 76% by high vegetation, landforms of the lie of the land or

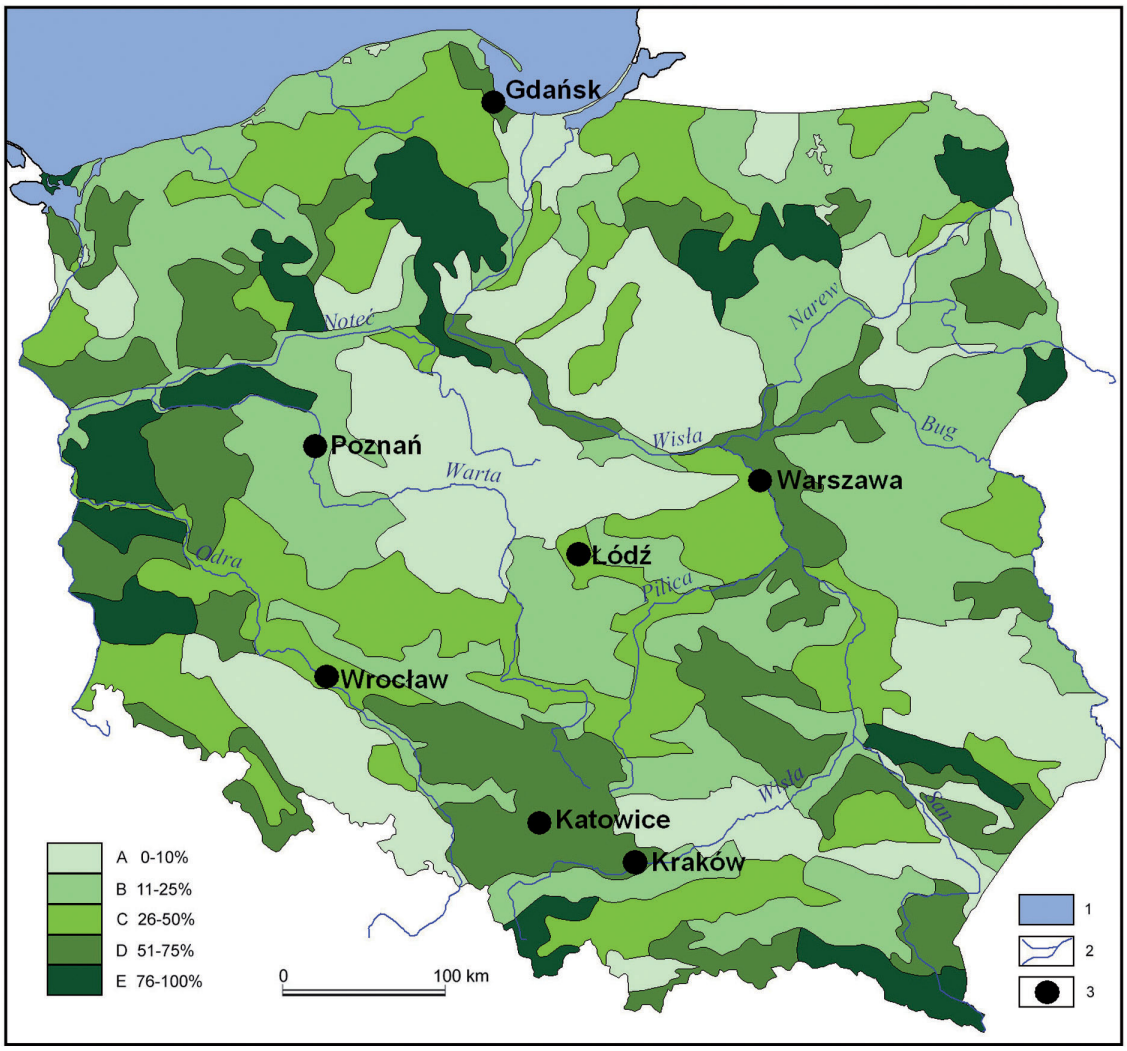

Fig. 2. The degree of landscape opening/enclosure in Poland in the 30s of the 20th century: A – open landscape (0–10%); B – nearly open landscape (11–25%); C – half-open landscape (26–50%); D – considerably enclosed landscape (51–75%); E – enclosed landscape (76–100%); 1 – Baltic Sea, 2 – river network, 3 – larges cities

high-density housing. These are dense wilderness areas or cities and industrial regions surrounded by huge forest complexes.

In order to compare the changes that the landscape has undergone over the last 100 years, a simplified map of enclosing/opening of the landscape in the 30s of the 20th century was made, reinterpreting interwar cartographic materials. The choice of this period of time was not random. As research shows, it was in this very period that a large-scale, anthropogenic opening of landscapes was observed in Poland (Maruszczak 1991, Plit 1996, 2004, Stepaniuk 2010, Myga-Piątek 2012). Since the analysis was conducted for the territory within the current borders, both Polish and German maps were used. In order to facilitate the comparison of the stages, the same regional units constituted the basis for the map. Also, the division into types in the legend was identical (Fig. 2).

Discussion of the findings

Due to the predominance of vast lowlands and low highlands of hilly, undulating lie of the land, the area of Poland should be potentially characterized by *open landscapes*. The relief in the periglacial period was flattened; therefore periglacial denudation plains, biogenic accumulation plains, moraines, numerous fluvioglacial forms and wide ice-marginal stream ways have gentle shapes and do not obscure the view. In the south of Poland, where there are low and medium

mountain ranges of the Sudetes and the Carpathians, the true horizon is either undisturbed (observations from the top parts of the mountains) or obscured in the valleys by the surrounding hills[2].

Poland is situated in the temperate, transitional climate in the area of deciduous and mixed forests. Polish natural landscapes are *enclosed,* obscured by dense high vegetation. In historical period fragments of *open landscapes* could only be found in boggy and marshy habitats close to rivers and lakes and also in the mountains over the tree line: the layer of Alpine vegetation of mountain pastures and peaks. Open landscapes constituted only a few percent of the primeval landscape of the Polish lands. Locally, the degree of landscape enclosure has undergone numerous changes caused by natural and cultural factors.

The spatial location of the landscape types in Poland shows some degree of organization. Open landscapes or landscapes characterized by a considerable degree of openness can be found in the central part of Poland. Kujawy as well as Chełmno, Dobrzyń, Ciechanów and Błońska Lands, the majority of Greater Poland, Silesian Lowlands and loess highlands of Lesser Poland have always had agricultural character and flatter lie of the land. A specific situation can be observed in the eastern and south-eastern parts of Poland (Podlachia, eastern part of Mazovia, Lublin Polesia[3]), where agriculture was fragmented. The increased degree of the landscape enclosure in this region results from a small-mosaic structure of the landscape.

A strip of considerably enclosed landscapes stretches from the lower Narew River to the upper Vistula and Oder. It is a densely populated, urbanized and industrialized area (Warsaw, Łódź, Kraków and Upper Silesia Regions). Agglomerations are surrounded by large-scale fruit farming and forest complexes used for recreational purposes (situated mainly along rivers).

A wide strip of *enclosed landscapes* (type E) and *considerably enclosed landscapes* (type D) can be found along the western border of the country. There are also two more parallel strips, one stretching along the Baltic coastline in some distance from the sea, and the other along the Noteć and Warta Ice-Marginal Streamway. Enclosed landscapes in this region consist of large dense forest complexes and urban areas of Tricity (Gdańsk, Sopot, Gdynia) and Szczecin.

Gradual enclosure of the landscapes in the Pomerania Region was commenced in the 17th century as a result of the depopulation caused by the Thirty Years' War, and intensified after the World War II (Plit 2009). Currently, boggy and marshy areas that were drained and started to be used for farming constitute the „islands" of open landscapes. The biggest of them are Pyrzyce Land, the borderline valleys of the Warta, Noteć and Oder as well as delta of Vistula (Żuławy).

Extended strips of enclosed landscapes can also be seen in the mountains (mainly in the Carpathians, but also in the Sudetes, the Świętokrzyskie Mountains and Roztocze). The landscape of these regions is obscured by forests. The area covered with forests has notably expanded since World War II[4]. Particularly quick and large-scale expansion was observed in the eastern part of the Polish Carpathians, caused by the displacement of the Ukrainian, Lemko and Boyko people during and after the war. The second reason for the increase in the forest area in the mountains was the disappearance of pasturing and giving up farming in difficult areas (Plit 2004).

The process of landscape opening in Poland

Cultural and economic human activities transformed enclosed landscapes into partly enclosed and then half-open landscapes. In some Polish regions, the process of forest elimination to obtain arable land caused nearly complete landscape

[2] Due to lowland character of the lie of the land in Poland, the omission to include landform features in the proposed indicator seems justified. In other countries, where the lie of the land is much more diversified and contrasting, this factor must be taken into consideration.

[3] The names of all areas are almost exclusively historical and cultural regions of Poland.

[4] Between the 80s and 90s of the 20th century, as a result of ecological disaster (air pollution and acid rains), numerous tree stands in the Sudetes were damaged or destroyed. The area was subsequently reclaimed and the forests were reconstructed with a slightly different species composition.

opening. Forest clearing and the decision to use land for farming and as meadows and pastures resulted in a considerable visual similarity of the Polish lands to a forest steppe.

The process of landscape opening did not start at the same time in the entire area, it had a different pace and it was not unidirectional. There were times, when after disasters and wars, forests returned to previously inhabited areas. Each land and region had its separate history. The lands that were deforested the earliest included: Pomerania, a strip of Lesser Poland Upland, Silesian Lowlands, Sudetes Foreland and volleys of big rivers (Plit 2007, 2009). They were later followed by Mazovia, Podlachia and the Carpathians. Environmental changes in the historical period for the territory of Poland and for chosen regions of Lublin and Cracow were presented by Maruszczak (1991) on a synthetic chart. A diagram for Mazovia was developed by Plit (1996).

Thinning out forests in order to obtain building materials and firewood as well as elimination of afforestation and burning clearings to get small land plot for farming constituted **the first stage** [from Neolithic to the 8th–9th century AD] of landscape opening by primitive inhabitants. At this stage of tools development, the most attractive place to settle was the border between coniferous forests and riparian forests (or alder forests and peat bogs), where access to water was fairly easy and food was varied.

Wilderness also thinned out as a result of pasturing cattle and pigs in forests and felling riparian trees to create meadows in the middle of forests. This process was later accompanied by setting up the first permanent settlements.

The second stage [9th–19th centuries]. For a long time there were two parallel trends of landscape opening in the Polish territory. Western and southern regions were more densely populated. According to cartographic sources, vast areas of open landscapes were found in Pomerania (Lubinus map of 1618), in Silesia (Hellwig map of 1561) and in East Prussia and Żuławy (Henefeld map of 1520). Open and half-open landscapes dominated near castles and towns. Rural settlements were surrounded by bigger and bigger deforested glades, and new settlements were located on cleared forest areas. As a result of tools development, forest stands that were more fertile but also more difficult to farm, such as mixed forest stands, oak and hornbeam stands, beech stands and elm and ash riparian forests, were also reclaimed. Pasturing was continued in forests, which were more and more frequently used for various purposes (wood was used for the production of tar, ash, potash and charcoal for the construction industry, handicraft and as firewood), thus resulting in thinning out tree stands, elimination of valuable tree species as well as creation and expansion of deforested glades.

The opening of the landscape occurred also as a result of opencast extraction of natural resources. High-calorie charcoal (obtained from hardwood broadleaf trees) was used for smelting and processing of the following metals: zinc, lead, silver, copper, and in particular iron which was smelted from turf ore. Other resources were also extracted: clay for the production of bricks, chalk or limestone for the production of slaked lime to be used as mortar, as well as cement and sand for melting glass.

Moreover, landscape opening had a settlement and defensive character, as open landscape facilitated the observation of enemies and the preparation of defence. The pace of the opening in different regions depended on natural conditions. The first towns in the Middle Ages were established among marshes (e.g. Łęczyca), on islands or peninsulas of lakes (Kruszwica, Poznań) or on river banks (Truso, Cracow, Sandomierz, Gdańsk). Riverside areas surrounding towns were quickly converted into arable land and farmed. The exploitation of wilderness and reclaiming of obtained lands proceeded steadily in the north-eastern direction and moved higher and higher into the Carpathians[5]. Permanent rural settlement in the wilderness area of the Mazovia – Prussia – Lithuania borderlands did not start until the 16th – 17th centuries. It was also the period of the most intense landscape opening in this region.

The third stage – beginning in the 19th century until the 50s of the 20th century – reclaiming and farming forests were introduced on a large scale and forests were artificially regenerated by planting trees that grew very fast. Furthermore,

[5] 14th–16th centuries: Vlach settlement in the Carpathians.

the density of stands was increased. Simultaneously, agricultural activities intensified thanks to the conversion from three-field crop rotation to four-field crop rotation and the introduction of new species and varieties of crop plants, agricultural machines and fertilizers. The changes in the methods of farming did not slow the pace of landscape opening. The demographic boom that started in the 19th century and lasted until the 50s of the 20th century caused land pressure, which lead to large-scale clearing of forests and converting them into arable land, as illustrated on (Fig. 2). During World War II, tree stands were wastefully exploited, forests were damaged by moving fronts, shellfire and numerous forest fires, trees were cut down in large numbers for the rebuilding of devastated village buildings, thus leading to the creation of huge deforested glades. A lot of villages and arable lands were abandoned, and forests started to spontaneously overgrow the wastelands. The biggest landscape opening was recorded directly after World War II. It was caused by large-scale cutting down of forests by the occupying forces, and the destruction of towns and villages, orchards, forests and flood banks by fronts. It can be assessed that, taking into consideration the area cover, the degree of landscape opening in Poland at that time reached 75%.

The fourth stage – from the second half of the 20th century. The process of afforestation of wastelands and poor soils was intensified after World War II. The ratio of forest areas to the area of the country increased considerably (from about 23% in 1947 to 30.5% in 2011), thereby halting, and subsequently reversing centuries-long trend of landscape opening.

The process of migration from villages to cities continued throughout the whole 20th century and speeded up after the transformation of the economic and political system of Poland. The development of industry after the war stimulated the growth of cities. Plenty of huge housing estates with high-rise blocks of flats were built, as well as numerous manufacturing plants, which intensified the process of landscape enclosure.

The process of spreading of a city and its housing estates to developments on open land surrounding the city has been observed presently (*urban sprawl*). Landscape enclosure has been accelerated by large shopping malls, entertainment centers, warehouses and manufacturing plants developing in the suburbs. Arteries connecting cities divide the landscape and create hermetic traffic routes separated from the surrounding landscape by noise barriers.

The process of abandoning farmlands continues in many rural regions. Former arable lands (which used to constitute *open landscapes*) have been overgrown with forests as a result of natural succession or have been purposefully afforested. This is a widespread process, occurring particularly in the vicinity of large cities. Landscape enclosure does not result only from the increase in forest areas. Large-scale orchard cultivation and common osier cultivation bring about the same effect. Such situations can be observed among others in Grójec Land, Nowy Sącz County, in the Vistula valley, Lubuska Land or in the northern part of the Kraków-Częstochowa Upland.

Conclusion

In the historical times, the process of landscape enclosing was not unidirectional. Numerous wars and natural disasters (particularly plagues) resulted in high death toll, depopulation of large areas and abandonment of farming, all of which lead to the regeneration of forests through natural succession. This reverse trend was most visible in the whole Polish territory after the Tatar invasion of Poland in the 12th century (Lesser Poland and Silesian Lowlands), after the Thirty Years' War in the 17th century (in western and northern Poland), and after the Swedish wars (in particular after the Swedish Deluge and the Northern War).

In the course of history, some Polish regions that used to be densely populated and developed agriculturally were either abandoned by inhabitants or their inhabitants were displaced. Former cultural landscape was obscured by flora encroaching on abandoned lands. It can still be observed in Bieszczady, the Lower Beskids, the Sudetes and in Przemyśl Land (Wolski 2007, Latocha 2009). Nowadays, similar processes occur in eastern Poland regions. Young people emigrate, old people die, the whole villages are deserted, and open landscapes become enclosed

as they overgrow with forests. However, a reverse process can also be observed. Huge cities, due to their economic attractiveness and growing employment market, attract new inhabitants (e.g. Warsaw, Cracow, Poznań, Wrocław). The process of landscape enclosure should be halted there through the restriction of chaotic spreading of cities to open rural areas which, until recently, have been farmed (as in case of Warsaw, the expansion of dispersed settlement to arable lands in Józefosław, Nowa Iwiczna, Mysiadło – real estate development system).

When comparing map 1 and map 2, it is conspicuous that the speed at which landscapes enclose is quite high, yet not the same for each region. The biggest changes occurred in the eastern parts of Poland. For the last seventy years, open landscapes or nearly open landscapes have been enclosing. This is usually a gradual process, correlated with migration of people and abandoning villages. After World War II, mass relocation of the Ukrainian people (from the Carpathians, Przemyśl Land and Lublin Region) and the German people (from Mazovia, Western Pomerania and the Sudetes) took place (Plit 1996, Latocha 2009, Szpikowski 2010). The result of these population migration is not clearly visible on the compared maps (it is best visible in case of Western Pomerania). As it frequently happens with statistical maps, changes of even more ten percent do not result in changing a bracket. In the centre of Poland, the process of landscape enclosure has been caused by the development of urban areas (landscape enclosure by the industry, warehouses, wholesale outlets and spontaneous construction of houses) and converting huge areas into orchards and plantations of high bushes.

However paradoxical it sounds, the process of landscape enclosure may be speeded up by activities that aim at the protection of environment. The best ideas may be distorted and misunderstood. Mountain pastures have been overgrown with forests due to the abandonment of sheep pasturing. Marshes surrounding the Biebrza River have also been overgrown, here as a result of limiting cattle breeding. Uncontrolled regeneration of beech woods has obscured monadnocks and xerotheric grasslands in the Ojców National Park. The area of enclosed landscapes keeps increasing, thus losing characteristic features, biodiversity and sometimes the unique character of cultural landscape. The protection of cultural landscape must include the necessity of preserving the traditional form of land use and the characteristic layout of fields and meadows. Modern landscape protection (of both natural and cultural landscape) requires constant and controlled intervention of a man. The distinct issue is the influence of opening/enclosing the landscape to the intensity of natural processes, including e.g. to wind and water erosion of soils.

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